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UGCT: the new CT facility of the Ghent University (Belgium)

M. Dierick[1], B. Masschaele[1], J. Vlassenbroeck[1], V. Cnudde[1], Luc Van Hoorebeke[1], P. Jacobs[2]

[1]Dep. of Subatomic and Radiation Physics, Ghent University, Proeftuinstraat 86, 9000 Gent, Belgium. [2]Dep. for Geology and Soil Science, Ghent University, Krijgslaan 281/S8, 9000 Gent, Belgium.

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The UGCT X-ray tomography facility is a cooperation between the Radiation Physics research group (Department of Subatomic and Radiation Physics, Ghent University) and the Sedimentary Geology and Engineering Geology research group (Department of Geology and Soil Science, Ghent University). The facility operates a number of setups offering a wide range of spatial resolutions, X-ray energies and sample sizes. First there is a state-of-the-art transmission type X-ray tube with sub-micron focal spot size (900 nm) for extreme-high resolution CT with resolutions down to 1 micron for samples up to 4 mm diameter. Secondly a high-power water-cooled X-ray tube is available with an energy between 30 and 160 keV for regular micro-CT applications with resolutions down to 3 micron. For large and/or heavy samples up to 40 cm diameter, a dedicated beamline is available at the linear electron accelerator with high-energy X-rays up to 10 MeV. The setups are built in room-size bunkers, allowing flexible experimental conditions such as conditioned environments or experimental equipment for real-time sample conditioning. In addition the facility also operates a desktop micro-CT scanner from Skyscan (model 1072) and a medical CT scanner from Philips (Tomoscan SR5000) for particular applications. The facility has several detectors available which are suited for the various applications. For nano- and micro-CT imaging, a high-resolution 16 bit CCD camera (4K x 2.7K 9μ pixels, 1:1 fiber-optic coupling) and a 12 bit flat panel CMOS detector (1024x512 50μ pixels) are available. For high-speed applications a 6'' large-field image intensifier can be used. For high-energy applications, a 1Kx1K CCD camera is used which is lens-coupled to a large scintillator that is optimized for high energies.

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Porous Coordination Polymers with Structural Regularity and Flexibility

Susumu Kitagawa

Kyoto University, Katsura, Kyoto 615-8510, Japan

Keywords: coordination polymers, porous materials, intermediate phases

The recent advent of porous coordination polymers (PCPs), as new functional microporous adsorbents has attracted the attention of chemists due to scientific interest in the creation of unprecedented regular nano-sized spaces and in the finding of novel phenomena, as well as commercial interest in their application for storage, for separation and in heterogeneous catalysis[1-5]. One of the advantages of PCPs, as compared with other microporous materials such as activated carbons, is designability, which provides a variety of surface properties based on organic ligands with functional groups, affording the potential to make the pore surfaces hydrophobic, hydrophilic, chiral and so on. This prominent feature leads us to expect that PCP will show a high adsorption capability for specific molecules. Here, we have found superb sorption of C_2H_2 molecules on the functionalized surface of an PCP and show an enhanced ''confinement effect'', which can be achieved by precisely and regularly arranged functionalities in the nano-sized pore wall, applicable to a highly stable, selective adsorption system[6]. We have succeeded in obtaining interesting array structures of benzene[7] and O_2 [8] molecules and observed their unusual properties in the nanochannel.

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